

# Artistic Style Transfer

Nicholas Tan, Elias Wang

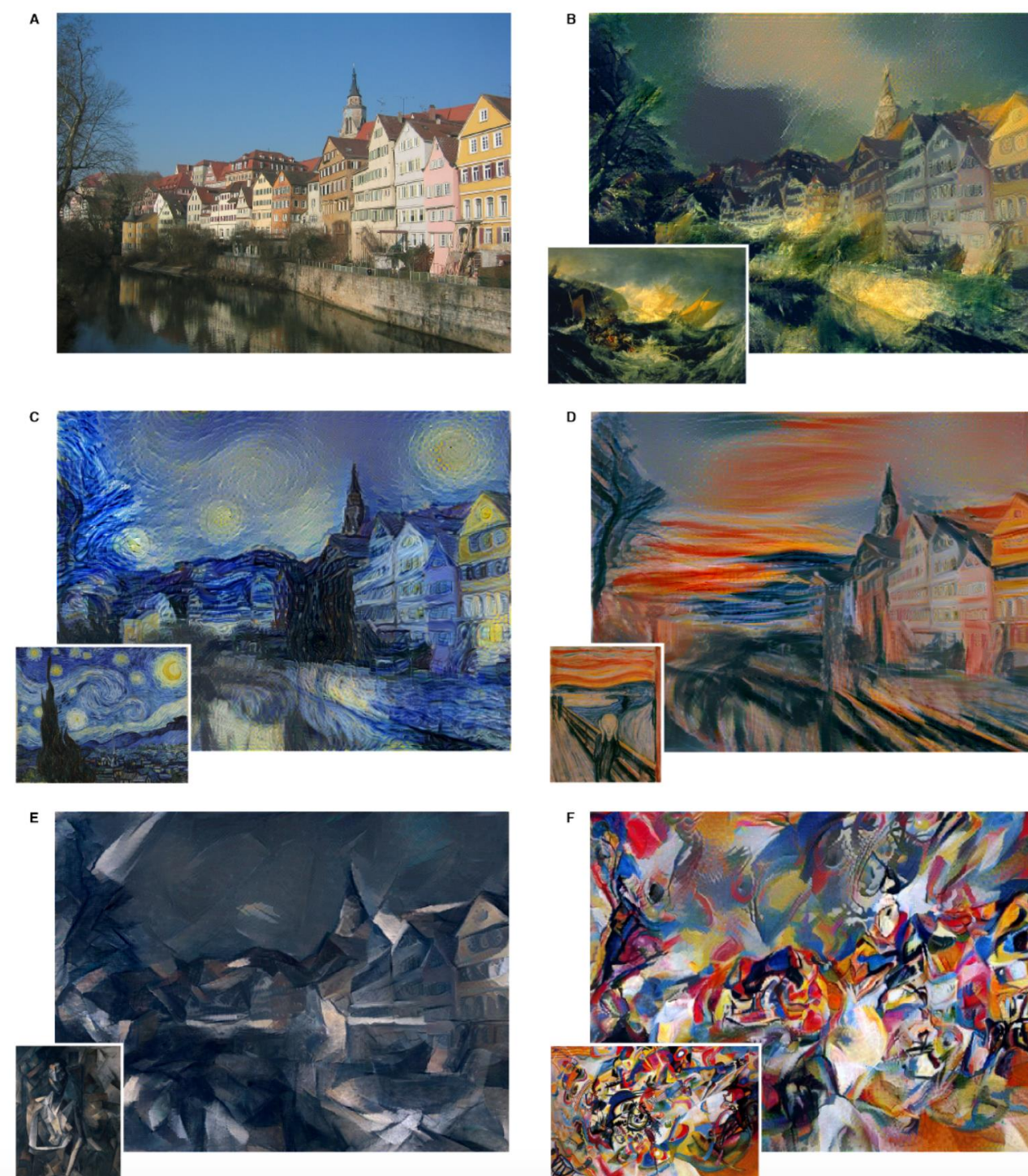
Department of Electrical Engineering, Stanford University

## Motivation

Using a biologically inspired vision model, called “Deep Neural Networks,” an artificial system can be trained to learn different styles of painting and subsequently recreate images rendered in that style.

The model is successful because it is able to distinguish between “style” vs. “content”, and merge the two.

Source: L.A. Gatys, A.S. Ecker, and M. Bethge, Image Style Transfer Using Convolutional Neural Networks, CVPR, 2016.

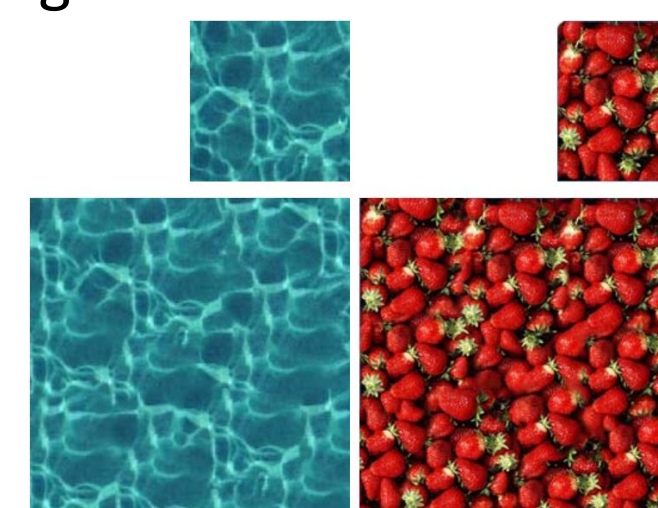


## Related Work



Source: M. Elad, P. Milanfar, Style-Transfer via Texture-Synthesis, Google Research, September 21, 2016

Using a modification of Texture-Synthesis it is possible to get fast and comparable style-transfer results. This method focuses on separating information-poor areas to hallucinate the style and high content areas where it keeps the original image



Source: V. Kwatra, I. Essa, A. Bobick, and N. Kwatra, Texture Optimization for Example-Based Synthesis, ACM ToG, Vol. 24, No. 3, pp. 795-802, 2005

## Algorithm Overview

Input:

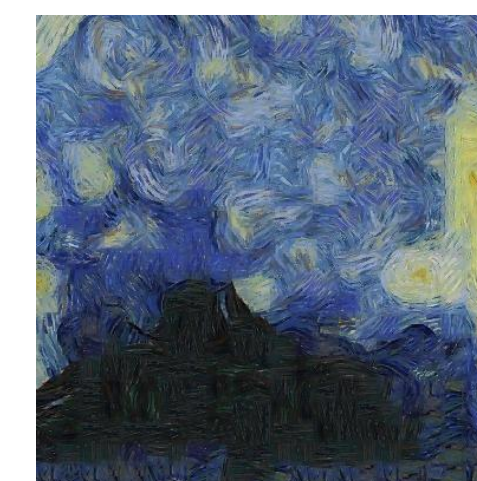
Content Image



Style Image

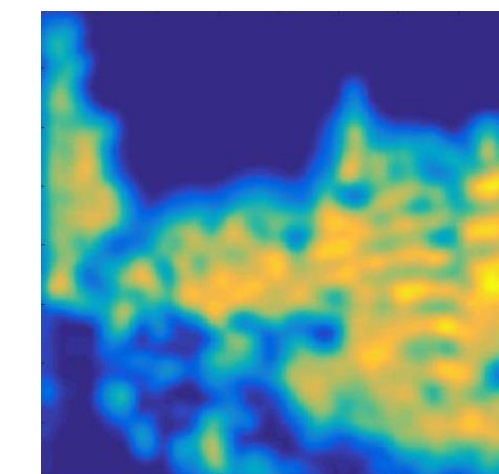


Hallucination

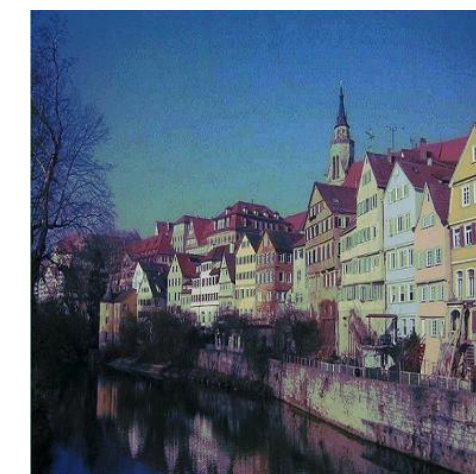


Initialization:

Segmentation



Color transfer



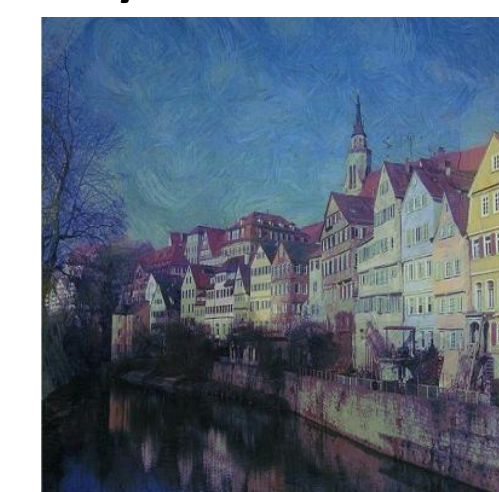
Add noise



Loop over scales:

Loop over patch sizes:

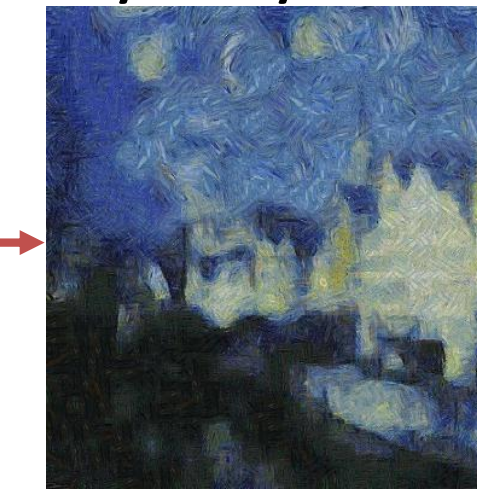
Style Fusion



Patch Matching



Style Synthesis



Content Fusion



Color Transfer

Denoise

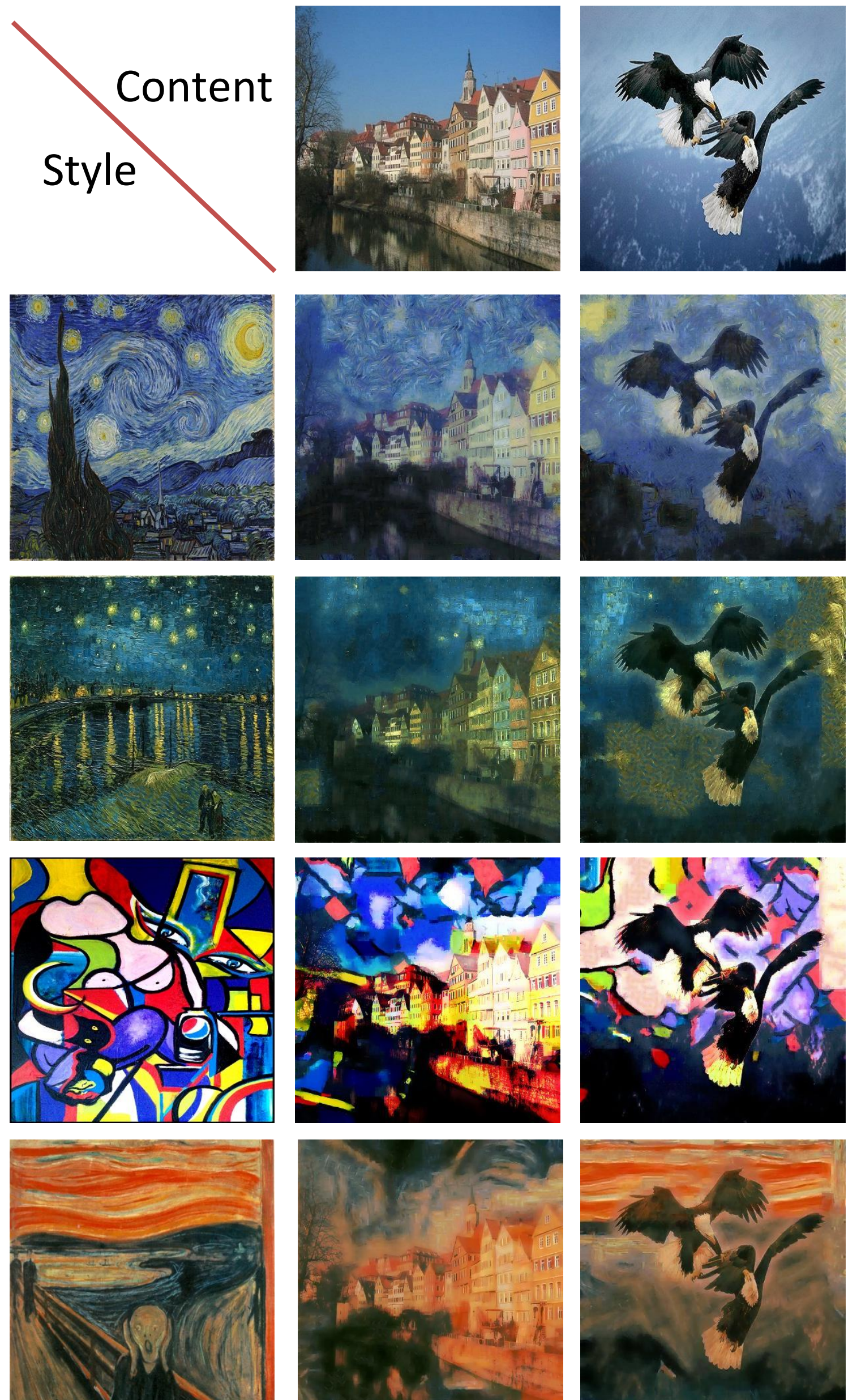
Resize Patch



Resize Estimate (finer scale)



## Experimental Results



Chosen parameters: 3 scales, 2 patch sizes (except smallest scale uses 3 patch sizes), 10% NN noise, 25%+75% hallucination averaging

Hallucination percentage influence :

0% 10% 25% 50%

